

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS

1-13. (Canceled)

14. (Currently Amended) A method for annealing a lithium niobate substrate, the method comprising:

heating said lithium niobate substrate in an environment having lithium niobate powder disposed therein, the lithium niobate substrate being separated from the lithium niobate powder by a barrier allowing a free flow of gas within the environment.

15. (Currently Amended) A method for annealing lithium niobate (LiNbO_3) structures, the method comprising:

heating a lithium niobate structure to a maximum anneal temperature in an oxygen gas (O_2) environment having and lithium niobate powder disposed therein, the lithium niobate substrate being separated from the lithium niobate powder by a barrier, the barrier inhibiting movement of the powder thereacross while permitting a free flow of the oxygen gas within the environment ~~to a maximum anneal temperature;~~

pressurizing the ~~sealed~~ oxygen gas atmosphere to exceed ambient atmospheric pressure;

maintaining temperature and pressure for a period of at least about 4 hours; and

cooling the structure to ambient temperature.

16. (Original) The method of claim 15 wherein said maximum anneal temperature is in a range of about 100°C to about 1000°C.

17. (Original) The method of claim 15 wherein said maximum anneal temperature is in a range of about 300 degrees Celsius to about 600 degrees Celsius.

18. (Original) The method of claim 15 wherein said maximum anneal temperature is about 300 degrees Celsius.

19. (Original) The method of claim 15 wherein said pressurizing includes pressurizing the oxygen gas atmosphere to a pressure within a range of about 1 psi above ambient atmospheric pressure to about 25 psi above ambient atmospheric pressure.

20. (Original) The method of claim 15 wherein said pressurizing includes pressurizing the oxygen gas atmosphere to a pressure of about 6 psi above ambient atmospheric pressure.

21. (Original) The method of claim 15 wherein said cooling includes cooling the substrate from the maximum anneal temperature at a rate within a range of rates of about 0.5 degrees Celsius per minute to about 40 degrees Celsius per minute.

22. (Currently Amended) A method for annealing lithium niobate (LiNbO₃)

structures, the method comprising:

heating a lithium niobate structure in an oxygen gas (O₂) and lithium niobate powder environment to a maximum anneal temperature;

pressurizing the sealed oxygen gas atmosphere to exceed ambient atmospheric pressure;

maintaining temperature and pressure for a period of at least about 4 hours; and

cooling the structure to ambient temperature. ~~The method of claim 15 wherein~~

said cooling including: ~~includes~~

cooling the substrate from the maximum anneal temperature at a rate of about 20 degrees Celsius per minute.

23-35. (Canceled)

36. (Currently Amended) A method for annealing a lithium tantalate substrate, the method comprising:

heating said lithium tantalate substrate in an environment having lithium tantalate powder disposed therein, the lithium tantalate substrate being separated from the lithium

tantalate powder by a barrier, the barrier inhibiting movement of the powder thereacross while permitting a free flow of gas within the environment.

37. (Currently Amended) A method for annealing lithium tantalate (LiTaO_3) structures, the method comprising:

heating a lithium tantalate structure to a maximum anneal temperature in a gas environment having and lithium tantalate powder disposed therein, the lithium tantalate substrate being separated from the lithium tantalate powder by a barrier, the barrier inhibiting movement of the powder thereacross while permitting a free flow of gas within the environment to a maximum anneal temperature;

pressurizing the ~~sealed~~ gas atmosphere to exceed ambient atmospheric pressure;
maintaining temperature and pressure for a period of at least about 4 hours; and
cooling the structure to ambient temperature.

38. (Original) The method of claim 37 wherein said maximum anneal temperature is in a range of about 100°C to about 1000°C.

39. (Original) The method of claim 37 wherein said maximum anneal temperature is in a range of about 100 degrees Celsius to about 600 degrees Celsius.

40. (Original) The method of claim 37 wherein said maximum anneal temperature is about 300 degrees Celsius.

41. (Currently Amended) A method for annealing lithium tantalate (LiTaO₃)

structures, the method comprising:

heating a lithium tantalate structure in gas and lithium tantalate powder

environment to a maximum anneal temperature;

pressurizing the sealed gas atmosphere to exceed ambient atmospheric pressure;

maintaining temperature and pressure for a period of at least about 4 hours; and

cooling the structure to ambient temperature, ~~The method of claim 37~~ wherein

said pressurizing is to within a pressure range of about 1 psi above ambient atmospheric pressure to about 25 psi above ambient atmospheric pressure.

42. (Currently Amended) A method for annealing lithium tantalate (LiTaO₃)

structures, the method comprising:

heating a lithium tantalate structure in gas and lithium tantalate powder

environment to a maximum anneal temperature;

pressurizing the sealed gas atmosphere to exceed ambient atmospheric pressure;

maintaining temperature and pressure for a period of at least about 4 hours; and

cooling the structure to ambient temperature, ~~The method of claim 37~~ wherein

said pressurizing is to a pressure of about 6 psi above ambient atmospheric pressure.

43. (Currently Amended) A method for annealing lithium tantalate (LiTaO₃)

structures, the method comprising:

heating a lithium tantalate structure in gas and lithium tantalate powder

environment to a maximum anneal temperature;

pressurizing the sealed gas atmosphere to exceed ambient atmospheric pressure;
maintaining temperature and pressure for a period of at least about 4 hours; and
cooling the structure to ambient temperature. ~~The method of claim 37~~ wherein
said cooling occurring within a range of rates of about 0.5 degrees Celsius per minute to
about 40 degrees Celsius per minute.

44. (Currently Amended) A method for annealing lithium tantalate (LiTaO_3)
structures, the method comprising:

heating a lithium tantalate structure in gas and lithium tantalate powder
environment to a maximum anneal temperature;
pressurizing the sealed gas atmosphere to exceed ambient atmospheric pressure;
maintaining temperature and pressure for a period of at least about 4 hours; and
cooling the structure to ambient temperature. ~~The method of claim 37~~ wherein
said annealing further comprises cooling at a rate of about 20 degree Celsius per minute.

45-58. (Canceled)

59. (Currently Amended) A method for annealing a crystalline substrate having the
formula RMO_3 where R is an alkaline earth metal, M is a Group IVB or Group
VB metal and O is oxygen, the method comprising:

heating said crystalline substrate in an environment having powder also formed of
 RMO_3 , the powder being disposed in the environment, the crystalline substrate being

separated from the powder by a barrier, the barrier inhibiting movement of the powder thereacross while permitting a free flow of gas within the environment.

60-68. (Canceled)

69. (Original) The method of claim 37 wherein said gas is oxygen (O₂).

70. (Currently Amended) The method of claim 37 wherein said gas is one or more gasses selected from the group ~~groups~~ consisting of Nitrogen (N₂), Argon (Ar), Helium (He) and Oxygen (O₂).

71-72. (Canceled)

73. (New) The method of claim 15 wherein the barrier is a porous interface.

74. (New) The method of claim 15 wherein said cooling includes cooling the substrate from the maximum anneal temperature at a rate of about 20 degrees Celsius per minute.

75. (New) The method of claim 37 wherein the barrier is a porous interface.

76. (New) The method of claim 37 wherein said pressurizing is to within a pressure range of about 1 psi above ambient atmospheric pressure to about 25 psi above ambient atmospheric pressure.

77. (New) The method of claim 37 wherein said pressurizing is to a pressure of about 6 psi above ambient atmospheric pressure.

78. (New) The method of claim 37 wherein said cooling occurring within a range of rates of about 0.5 degrees Celsius per minute to about 40 degrees Celsius per minute.

79. (New) The method of claim 37 wherein said annealing further comprises cooling at a rate of about 20 degree Celsius per minute.

80. (New) A method for annealing a crystalline substrate, the method comprising:

providing a container;

placing the crystalline substrate in a first region of the container;

placing a powder in a second region of the container, the powder being of the same composition as the crystalline substrate;

separating the first region and the second region with a barrier, the barrier inhibiting movement of the powder thereacross while permitting a free flow of gas within the container; and

heating the container.

81. (New) The method of claim 80 wherein the barrier is a porous wall.
82. (New) The method of claim 80 wherein the crystalline substrate and the powder are lithium niobate (LiNbO_3).
83. (New) The method of claim 80 wherein the crystalline substrate and the powder are lithium tantalate (LiTaO_3).
84. (New) The method of claim 80, further comprising;
pressurizing the container with an oxygen gas environment during said heating.